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Verification of Translation

I, Dr. Waldemar Leitner, Zerrennerstraße 23-25, D-75172 Pforzheim, Germany, German and European patent attorney, fully conversant with the German and English languages, hereby certify that I am the translator and that to the best of my knowledge and belief the following is a true translation of the International Patent Application No. PCT/EP99/06264 with the text as originally filed.

Signed this February 23, 2001

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Method for producing a hybrid frame or hybrid housing and a corresponding hybrid frame or hybrid housing

Description

The invention relates to a method for producing a hybrid frame or hybrid housing, in which a leadframe with soldering and/or bonding tags after being placed into an injection mould is held in this injection mould and is moulded with plastic to form a housing part of the hybrid frame or the hybrid housing, and to such a hybrid frame or such a hybrid housing.

Upon punching of the soldering and/or bonding tags of the leadframe a buckling due to punching occurs. This buckling due to punching can cause in a disadvantageous manner the buckling of the whole surface of the leadframe, so that there is no plane and regular surface especially of the soldering and/or bonding tags. The soldering or bonding tags of the leadframe, which project from the plastic material after moulding, are not held during moulding, but it is only provided, that the injection mould is formed in a way, that the bonding tags cannot move in the plastic injection mould during the moulding process.

A method with the features mentioned at the beginning is known from the JP 57 010955. There a leadframe is put into a two-part mould. By joining together the two parts of the mould, the soldering and/or bonding tags of the leadframe are bent by the co-acting of projections in the one part of the mould and grooves in the other part. Furthermore, the frame of the leadframe is held and fixed during the moulding process by means of pressing rods. The bending of the soldering and/or bonding tags is not capable of compensating a buckling due to punching of the soldering and/or bonding tags, which occurs upon punching the leadframe, so that also after moulding the leadframe, in a disadvantageous manner, no plane and regular surface of the soldering and/or bonding tags is provided.

From the US 5,359,761 a method is known, in which a leadframe is put in a two-part mould and moulded with plastic material. Furthermore, there is provided a punching apparatus, with which a frame of the leadframe can be torn off along a predetermined breaking point, while the leadframe is positioned in the two-part mould.

From the EP 0 642 165 a hybrid frame made of plastic material with electric connection elements is known, which has a stiffening produced by a form-stamping.

It is therefore the object of the invention to further develop a method of the kind mentioned at the beginning, that the quality of the surface of the soldering and/or bonding tags of the hybrid frame or hybrid housing to be formed is improved.

This object is achieved according to the invention, in that the soldering and/or bonding tags of the leadframe are held down in the injection moulding die for the compensation of surface defects at least during a part of the injection moulding process by means of a stamp.

The method according to the invention distinguishes itself in that by the measures according to the invention the position of the individual soldering and/or bonding tags of the leadframe is well reproducible and can be dimensioned within close limits. The holding down of the individual bonding surfaces by the stamp during the moulding process brings forth in an advantageous manner, that surface defects of the leadframe are compensated. Furthermore, it is advantageous, that by the holding down of the bonding tags during the moulding process, the vibrational behaviour of the bonding tags is influenced in a positive manner. The invention has the further advantage, that in this manner the bonding surfaces are protected from moulding influences during the moulding process. The holding down of the soldering and/or bonding tags of the leadframe during the moulding process has the advantage, that in this manner position tolerances in a direction perpendicular to the surface of the leadframe are compensated, so that a good reproducibility in this z-axis is given as well.

Further advantageous variants of the invention are subject of the dependent claims.

Further details and advantages are to be inferred from the embodiment, which is described in the following by the single figure. It is shown in:

Figure 1 a schematic representation of a hybrid housing.

In figure 1 an embodiment of a hybrid housing 1 is shown, which is known and therefore not shown and described in detail, which is generally made up of a housing part 2, which is produced by moulding a leadframe in an injection mould, and of the bonding tags 3a-3c of the leadframe 3 projecting from the housing part 2. The bonding tags 3a-3c have a form-stamped section 3a'-3c', respectively, which is surrounded by a holding section 3a"-3c".

The form-stamped section 3a'-3c' here is the section, on which during the moulding process in the injection moulding die a forming stamp not shown in the figure puts on in order to hold down the bonding tags 3a-3c during the moulding process.

It has to be stated here, that it is preferred, that the stamp holding down the bonding tags 3a-3c is made as a forming stamp, as in this manner the bonding tags 3a-3c are not only positioned and protected during the moulding process, but are at the same time form-stamped, so that this form-stamping process does not impose additional costs. It is preferred that here a forming stamp with a polished surface is used, which results in a bonding surface of a particularly high value and being particularly reproducible.

However, it has to be stressed, that for a multiplicity of applications it is sufficient, if the bonding tags are only held down by a corresponding stamp, i. e. that no form-stamping process occurs.

In the embodiment described above it is assumed, that it concerns a hybrid housing with bonding tags. But it is also possible, to form a hybrid frame with bonding tags by the same method. It is also possible that instead of the bonding tags soldering tags are formed.

It does not require any further explanation that the number of three bonding tags 3a-3c shown in the embodiment is only of exemplary character. It is of course possible to provide fewer or - what will occur more often in practice - more than three bonding tags.